

**§ 27.659**

(3) The blade must be designed to prevent water from becoming trapped in it.

(b) Paragraphs (a)(1) and (2) of this section does not apply to sealed rotor blades capable of withstanding the maximum pressure differentials expected in service.

[Amdt. 27-2, 33 FR 963, Jan. 26, 1968]

**§ 27.659 Mass balance.**

(a) The rotors and blades must be mass balanced as necessary to—

- (1) Prevent excessive vibration; and
- (2) Prevent flutter at any speed up to the maximum forward speed.

(b) The structural integrity of the mass balance installation must be substantiated.

[Amdt. 27-2, 33 FR 963, Jan. 26, 1968]

**§ 27.661 Rotor blade clearance.**

There must be enough clearance between the rotor blades and other parts of the structure to prevent the blades from striking any part of the structure during any operating condition.

[Amdt. 27-2, 33 FR 963, Jan. 26, 1968]

**§ 27.663 Ground resonance prevention means.**

(a) The reliability of the means for preventing ground resonance must be shown either by analysis and tests, or reliable service experience, or by showing through analysis or tests that malfunction or failure of a single means will not cause ground resonance.

(b) The probable range of variations, during service, of the damping action of the ground resonance prevention means must be established and must be investigated during the test required by § 27.241.

[Amdt. 27-2, 33 FR 963, Jan. 26, 1968, as amended by Amdt. 27-26, 55 FR 8000, Mar. 6, 1990]

**CONTROL SYSTEMS**

**§ 27.671 General.**

(a) Each control and control system must operate with the ease, smoothness, and positiveness appropriate to its function.

(b) Each element of each flight control system must be designed, or distinctively and permanently marked, to

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minimize the probability of any incorrect assembly that could result in the malfunction of the system.

**§ 27.672 Stability augmentation, automatic, and power-operated systems.**

If the functioning of stability augmentation or other automatic or power-operated systems is necessary to show compliance with the flight characteristics requirements of this part, such systems must comply with § 27.671 of this part and the following:

(a) A warning which is clearly distinguishable to the pilot under expected flight conditions without requiring the pilot's attention must be provided for any failure in the stability augmentation system or in any other automatic or power-operated system which could result in an unsafe condition if the pilot is unaware of the failure. Warning systems must not activate the control systems.

(b) The design of the stability augmentation system or of any other automatic or power-operated system must allow initial counteraction of failures without requiring exceptional pilot skill or strength by overriding the failure by movement of the flight controls in the normal sense and deactivating the failed system.

(c) It must be shown that after any single failure of the stability augmentation system or any other automatic or power-operated system—

(1) The rotorcraft is safely controllable when the failure or malfunction occurs at any speed or altitude within the approved operating limitations;

(2) The controllability and maneuverability requirements of this part are met within a practical operational flight envelope (for example, speed, altitude, normal acceleration, and rotorcraft configurations) which is described in the Rotorcraft Flight Manual; and

(3) The trim and stability characteristics are not impaired below a level needed to permit continued safe flight and landing.

[Amdt. 27-21, 49 FR 44433, Nov. 6, 1984; 49 FR 47594, Dec. 6, 1984]

**§ 27.673 Primary flight control.**

Primary flight controls are those used by the pilot for immediate control